

COOP'S TECHNOLOGY DIGEST

-A Timely Report On The World Of Communications-

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COOP'S TECHNOLOGY DIGEST

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Multi-TV Set Home / Reached By Satellite: Not Yet Ready For The Big Time

In the standard DBS (Direct Broadcast Satellite, or DTH) pay TV service individual homes require a satellite antenna, outdoor electronics (called LNBF), cabling and - indoors - the IRD or integrated receiver decoder. This is essentially the same categories of equipment which Sky (NZ) has required for UHF TV terrestrial transmissions. A comparison between the two installations is shown below.

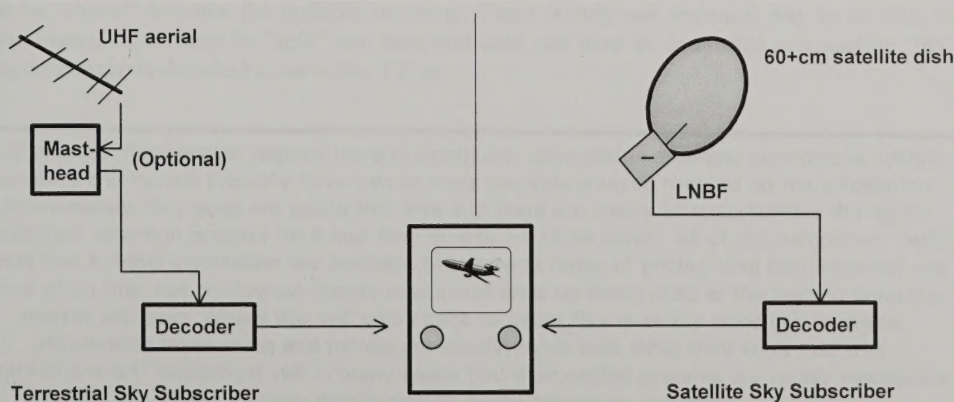
With terrestrial UHF service:

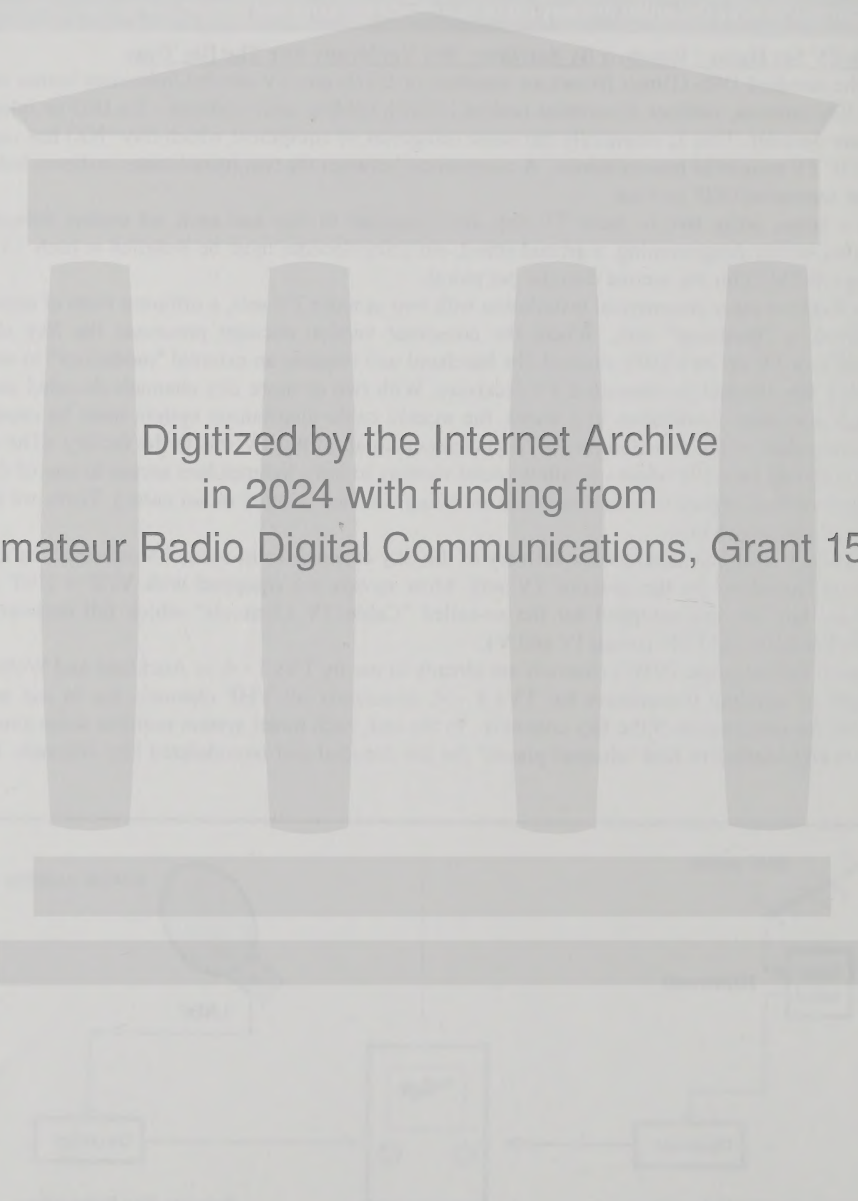
In a home, when two or more TV sets are connected to Sky and each set wishes independent selection of Sky programming, a second (third, etc.) Sky decoder must be installed at each TV. Sky charges (NZ\$15) for the second decoder per month.

In a motel or other commercial installation with two or more TV sets, a different form of decoder is employed; a "baseband" unit. Where the consumer version decoder processes the Sky channel through to a TV set on a UHF channel, the baseband unit requires an external "modulator" to send the decoded Sky channel to connected TV receivers. With two or more Sky channels decoded and sent through accessory modulators in a motel, the motel's cable distribution system must be capable of delivering each of the new (unique for Sky) channels to all of the TV sets in the facility. (The reason for this should be self evident - to allow motel viewers to have independent access to any of the Sky channels without regard to which channels are being watched in other motel units.) There are several technical challenges here.

1) The TV channels selected for delivery of the Sky channels to in-room TV sets must be capable of being "tuned-to" by the in-room TV sets. Most motels are equipped with VHF + UHF tuning receivers but few are equipped for the so-called "Cable TV Channels" which fall between VHF (bands I and III) and UHF (bands IV and V).

In each market, some (VHF) channels are already in use by TVs 1 - 4; in Auckland and Wellington, because of multiple transmitters for TVs 1 - 4, commonly all VHF channels are in use and not suitable for reticulation of the Sky channels. In the end, each motel system requires some amount of custom engineering to find "channel places" for the decoded and remodulated Sky channels. Motels





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and other commercial establishments pay a fee for this customised equipment; several thousand dollars for a 15 unit motel is not uncommon.

As of October 31 (1997), Sky documents claimed 3,155 "commercial" installations; 2,720 of these receive their service from Sky UHF terrestrial transmitters (just under 1% of total Sky customers) while in the Sky analogue satellite service, 435 commercial installations (out of a universe of 11,055 or 3.9% of total) have been sold.

So on each Sky commercial account premise there are multiple Sky (baseband version) decoders each of which is connected to some type of modulator which creates within the motel a new TV channel for Sky reticulation. Sky commercial installations are done by "approved installers" and a motel, for example, is typically given a short list of 2 or 3 "possible installation firms." It is up to the motel (commercial customer) to arrange for the equipment and its installation which will make possible Sky reticulation. The commercial customer ends up paying for (and owning) everything in the upgrade for Sky reticulation except the decoders from Sky (1).

Non-commercial (domestic) terrestrial (UHF-TV) served accounts are allowed to have extra Sky decoder(s); the cost is \$65 for installation and \$15 per month per extra decoder. This allows a household with two (or more) TV sets to have selection of any of the Sky channels on any TV set decoder equipped.

Officially, Sky analogue DTH subscribers (who presently have access to Sky Sport and Sky Orange) cannot acquire a second decoder. Satellite viewers are being told, "You will have to wait for our digital service" to have two or more in-home TV sets connected with separate decoders.

How Satellite Complicates Multiple Set Service

Whether the pay TV service is delivered through terrestrial transmission or satellite, for each TV receiver connected to the aerial a separate decoder is required. Unless. Unless, as with the terrestrial motels, a special version decoder is installed which sends the decoded video and audio to an on premise modulator which establishes a new (often UHF) channel for the reticulated Sky channel. The same procedure could be followed for homes as well but the cost of providing separate decoders and separate modulators for each home would be prohibitive (and certainly cost the viewer far more than the \$15 Sky now charges for a second decoder unit). A modulator (connected to a coaxial cable distribution system, going to each TV receiver) allows one decoder to service multiple TV sets with the same Sky channel.

Terrestrial Sky service utilises UHF channels which are directly compatible with all but the oldest, most poorly designed cable reticulation systems (and TV sets). A home with two or more TV outlets can typically "share" the Sky service between multiple TVs with no special technical problems. Unfortunately, as Sky moves to satellite delivery all of the rules change and an entirely new series of technical problems are raised when two or more TV sets are to be connected to a common aerial.

More Background

When two or more TV sets are connected to a single satellite antenna system (serving a home), two things immediately happen:

1) The signals received and processed by the satellite dish aerial + the LNBF outdoor electronics must be "shared" between the multiple receivers. There is only one technical way to do this; the original aerial signal must be "split" into parts and each part must be connected to a satellite "IRD" (integrated receiver decoder) to serve one TV set.

1/ In most metropolitan regions there is significant competition amongst commercial system installers and motels typically have two or more possible sources that bid on the installation. Unfortunately, Sky does not police this area and there are plenty of opportunities during the equipment selection process for a less than quality job to be done. All of the component parts going into a motel installation are available over a wide range of pricing (and performance) and more often than not the lowest quality equipment ends up being used at the highest price the market will bear. Where this will come back to haunt Sky is as the transition to digital distribution takes place and motels previously wired with what they were told was "state-of-the-art" equipment will in many cases find their cabled systems are totally inadequate for to-room distribution of digital television; see text.

2) Each TV set must have its own dedicated "IRD" or decoder unit in order to allow each TV to select independently the programming it wishes.

Signals can be "shared" between two or more TV sets using techniques borrowed from terrestrial TV house wiring systems. A master cable from the LNBF goes to a signal splitter which divides the available signal into two (or three or four) parts. Each "part" is then cable connected to a separate IRD unit. What does not "translate" from normal TV aerial practices is the type and quality of cable and the signal splitters. A house previously wired for multiple TV outlets for terrestrial TV is equipped with the wrong cable, the wrong splitter(s) and even the wrong cable connectors for satellite TV "sharing." The frequency range of normal TV is 45 to 806 megahertz (MHz). The frequency region covered by satellite signals carried from the aerial/LNBF to the IRD is in the region of 950 to 2,150 megahertz (MHz). The "quality" of the interconnecting cable, the splitters and the connectors suitable for terrestrial TV falls far short of the quality required for satellite TV wiring.

Simply stated - for a home to have two or more satellite connected TV sets will require an additional IRD for each TV set, and, a rewiring of the house for "satellite TV" as separate from "terrestrial TV" wiring.

The Sky Digital Terrestrial Announcement

Last August Sky advised installers and a segment of its satellite customer base of a plan to place terrestrial TV services 1 through 4 within their satellite TV "bouquet." On the surface this sounds like a good plan. For Television New Zealand to convert from the present analogue to the new digital transmission format will require a capital expenditure approaching \$200 million plus an annual loss-making operating cost for the twin extra network of transmitters running into the tens of millions per year. TV3 and TV4 face a similar capital cost and operating loss.

By placing the terrestrial service from TV1, 2, 3 and 4 on satellite, Sky is making available (for a price, certainly) a digital national distribution network for the present analogue stations without a significant capital expense. But there are problems.

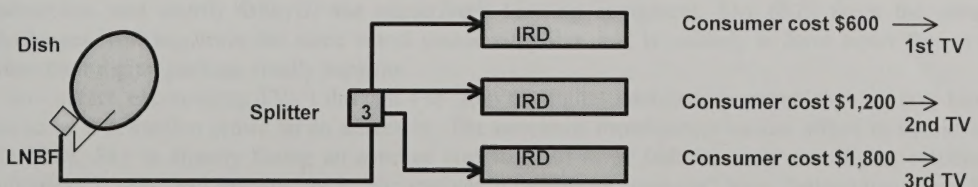
1) To state the obvious, Sky earns revenue by selling TV programming packages for a monthly fee. Other charges (programming guide, reception equipment) are supportive of their core business.

2) The terrestrial broadcasters earn revenue almost totally through the sale of commercial sponsorship (advertising) packages.

Sky's reasons for encouraging terrestrial commercial TV participation in their digital initiative are many, and include:

1) Public interest in acquiring a (Sky) digital satellite system will be enhanced if "digital quality" reception from the terrestrial networks is included. Sky believes it will earn more revenue from per-event programming than with subscription package channels with a crossover point someplace around 2005 (i.e., when per-event revenue will exceed subscription revenue). It follows that any marketing plan that speeds up the penetration of (satellite) digital reception packages into New Zealand homes as required to take advantage of per-event programming offerings is to Sky's advantage.

2) The cost of digital reception equipment remains very high. Sky is discovering it is almost impossible to break below the \$1,000 per home cost barrier (and that is for a single IRD unit) in the present IRD marketplace. By comparison, Sky has a cost of under \$400 in the typical analogue (UHF) TV reception package installed for subscribers. Any plan that shifts some portion of the digital roll out costs to the consumer at large benefits Sky.



3) Politicians have bought the story that conversion to digital for state broadcasters TVNZ (plus independents TV3 and 4) will be very expensive. They are in favour of any plan that reduces those costs. If somehow the consumers can be persuaded to spend *their own* money to be equipped for digital reception, this will lessen the burden on SOE TVNZ.

Creating a plan that rolls out Sky's digital with the combined package of terrestrial TV in digital form accomplishes several objectives. Western Australia's government is paying A\$750 for the conversion of each existing outback analogue TV reception terminal to digital. In the UK, Murdoch's BSkyB rollout of digital later this year has a per home cost to BSkyB in the region of (NZ)\$600 and this is a cost which BSkyB must somehow carry on its own if it hopes to get a good response for digital conversion from the more than 5,000,000 UK homes now equipped for (analogue) satellite TV reception.

What was not initially considered is the need to deal with the 2+ TV sets now operating in the typical New Zealand home. In metropolitan areas, statistics tell us the average home has 2.7 TV receivers with a "multi-channel home" (i.e., those with Sky in addition to terrestrial TV) almost twice as likely to have multiple TV sets than terrestrial-only TV homes. If a "standard" digital reception system has a cost-to-Sky in the region of \$1,000, what happens when a multi-set home requires an IRD (decoder) for each TV set?

At the lowest possible consumer pricing level now or forecast through the year 2002, each additional IRD will cost the consumer something in excess of (NZ)\$600. With bargain priced second sets from Asia now selling for under \$300 in the marketplace, an IRD that allows the "second" set to *access* (digital) satellite signals at \$600 becomes unwieldy. And that is a problem.

With an expansion of terrestrial services TV1 - 4 to satellite, essentially each TV set in the home *must* have an IRD. That means \$600 to equip each TV set with a "special box" that allows the new (digital) TV1 - 4 service to be viewed. Ouch. Add to that the requirement that any home with two or more TV receivers must be newly wired with cable, a signal splitter and possibly a special satellite rated in-house amplifier, and you have another several hundred dollars basic cost just to equip the home for receiving the terrestrial TV services in digital form via satellite. And that is why you have not heard more said about the "promise" of terrestrial channels being delivered via satellite since the initial Sky announcement last August.

In a home with (the metropolitan average of) 2.7 TV sets, assuming the need for rewiring of the home for satellite distribution to the multiple sets, we have a total cost per household of not less than (NZ) \$2,170 just for the capital equipment required in the house to receive the new digital broadcasts on each TV in the home. Double ouch.

Surely these are early entrant costs and the prices will tumble rapidly after the first few years? Actually, these are not early adopter prices at all. The IRDs are now into their fourth generation and the best world-wide price at the maximum discount level is just now breaking US\$260 (NZ\$442 at the 50,000 buy level Sky might command) with no indication it will drop more than \$20 by 2002. The costs of labour (for the installation and wiring the household), and the costs for the cable and other parts are not projected to drop by more than 10% in the year 2002. Inflation over the next four years stands a good chance of balancing any price reductions resulting in a net-price 4 years out that is equivalent to today's pricing.

As the much maligned Australis/Galaxy discovered in Australia, as Multichoice found out the hard way in South Africa, as Indovision has been forced to admit in Indonesia, the very high cost of the digital satellite receiving packages creates a perhaps impossible barrier to profitable DBS/DTH operation if the programmer must either pay for (Australis/Galaxy) or heavily subsidise (Multichoice, Indovision, and shortly BSkyB) the subscriber's viewing equipment. Sky (NZ) faces the same challenges, will buy from the same world source suppliers, and is unlikely to have better fortunes when their digital package finally happens.

So - in fact, encouraging TVs 1 through 4 to "join the digital satellite movement" may actually turn out to be a detraction rather than an attraction. The terrestrial broadcasters cannot afford to subsidise the IRDs, Sky is already facing an average cost to itself of \$1,000 for each new digital satellite subscriber it sells and few are optimistic enough to believe an "average" New Zealand household is going to willingly, or more important - quickly - shell out of \$2,170 to become "satellite equipped."

It will take some very clever marketing to convince the consumers they cannot live without *this* capital expenditure. And remember - this "capital cost for equipment" has nothing to do with per month or per event programming costs, which will come on top of the equipment costs.

There is another element to the inclusion of TV1, 2, 3 and 4 on digital satellite. Will it be "free" (as in no monthly charge) or will it require a fee? New Zealand On Air has recently been advising those who enquire, "We have not resolved this issue at this point. The very foundation of the annual TV licence fee is at the root of this question." Indeed, to fund the costs of going digital through the Sky bouquet, the terrestrial broadcasters would like to collect from the viewers. The viewers most likely to initially benefit from the digital service are those living where terrestrial TV is poor or incomplete (i.e., lacking TV3 and 4 for example). People who already pay an annual NZOA fee are unlikely to graciously accept a further charge for digital signal delivery and NZOA fears there might be a move on the part of the terrestrial broadcasters to have some portion of NZOA's annual revenue spent to cover their digital costs. There are plenty of unresolved issues still ahead - and the Sky digital launch clock is running.

Does this suggest that Sky's move to satellite, perhaps with the terrestrial TV broadcasters in tow, is a flawed plan? The answers are found by studying the success (or failure) of other digital satellite programme suppliers world-wide. The largest satellite programmer company today is BSkyB. Unfortunately for our purposes it does not count for study. Why?

- 1) It is an analogue service with far lower receiving system costs, and more important,
- 2) The viewers buy their own systems (typically under NZ\$500 all up these days in Europe)

The largest digital provider is the DirecTV system in the USA. There is the start of a comparison there, but only a start:

1) After 3.5 years of operation, the service now reaches 3.1% of US homes. Reaching 3.1% of New Zealand homes would mean approximately 36,000 homes served. If Sky's satellite service, how ever many channels it offers, has only penetrated 36,000 NZ homes by January 2002 (3.5 years out from the announced start date), Sky NZ will be in big trouble.

2) DirecTV offers 175 channels of programming, 50 of which are dedicated to NVOD (near video on demand - near theatre release date movies that start on the half hour). Sky has a maximum capacity of between 30 and 45 channels based upon satellite space available. If 175 channels only attracts 3.1% of the potential audience homes after 3.5 years, how will 30 to 45 channels fare here?

3) DirecTV home systems sell in the US marketplace under intensely competitive conditions for below US\$200. Yes, there *is* a programmer (DirecTV) subsidy possible - it amounts to US\$152 (CTD 9709, p. 8) which goes directly to the dealer selling the equipment, not to the consumer (except through discounting of the hardware at the retail level). Sky plans to appoint a single IRD supplier and unlike the US and UK (BSkyB digital) model, the IRD package is not to be a retail item but rather a through-Sky single source item.

By taking competition out of the IRD marketplace, Sky controls the marketplace. But, by not allowing IRD (satellite system) competition, Sky guarantees itself it will pay more for the equipment over time than comparable equipment will be selling for elsewhere in the world.

4) DirecTV is still losing money - big money - after 3.5 years of operation. If digital DTH cannot make (or has not yet made) money in the USA, even with 175 channels of programming and US\$200 consumer cost satellite receiving systems, what does that tell us about Sky's chances with \$1,000 hardware costs and perhaps 30 channels of programming?

Perhaps

...just perhaps, the "financial model" is flawed. Perhaps - just perhaps - digital satellite television is one of those wonderful innovations that sounds good only if you say it very fast and don't stop to analyse what it really costs to implement.

The premise with satellite delivery is that you cover a very large geographic area without any wires and if some precalculated percentage of all homes capable of receiving the service do in fact subscribe, you will make a profit. The premise was always the viewer would purchase his own receiving equipment; the programmer would be responsible only for the costs of the programming and the transmission.

Digital seems like a wonderful concept because it allows more channels of programming material to be transmitted for a fixed satellite space segment cost. What virtually everyone has overlooked from the beginning of digital's promise is the 3 to 5 times higher viewer cost for the digital receiving equipment. It was always assumed that after a few years, the cost of the digital receiving equipment would come down to comparable analogue equipment. Unfortunately, five - six - seven years into the digital revolution this has yet to happen. Which places the programmer in a bad spot.

If he elects to "go digital," he must accept that a smaller percentage of the potential homes can afford or will spend the sharply higher cost attendant to digital dish system installations. If, like the Australian failed Galaxy model, the programmer decides the equipment cost will not be accepted by the consumer, he is faced with somehow subsidising that equipment cost. This is the position Murdoch finds himself in with the launch of BSkyB digital in the UK later this year. His marketing people tell him the "average" UK home "might spend up to 200 pounds for a digital switch out" and anything over that 200 pound level "should be subsidised by BSkyB." In New Zealand terms, this amounts to a subsidy of around (NZ)\$500 per home.

This is only modestly better than the Australian model where presently Galaxy collects A\$200 for installation of a home system that cost them A\$1,100 (in some Australian areas, anyone agreeing to pay in advance for a year's programming - A\$600 - can get a special "deal" of \$50 installation). In the worst case, Galaxy carries on its books a going in cost of A\$1,050 for a home that has just become a subscriber. BSkyB faces a cost of NZ\$500 per new subscriber (converting from analogue to digital or becoming a subscriber for the first time).

This kind of financial penalty to gain subscribers is not insignificant and it makes a mockery of the original concept that digital was going to be a lower cost, more efficient method of distributing programming to subscribers through satellite delivery.

A number of studies have insisted that satellite delivery of digital was going to turn out to be the least costly, most profitable method of distributing multiple channels of television programming to a nation or region. Many of these studies have compared the cost of delivering satellite programming against the cost of delivering the same programming via cable TV. In the analogue world, the studies showed that for a per-home cost of around NZ\$500 for each home served, satellite could deliver many dozens of programme channels (as, indeed, BSkyB has shown can be done in the UK). The studies then attempted to show that a cable television system in a market such as Auckland was going to spend the equivalent of \$1,000 for each *potential* subscribing home it passed with cable and then in the best case the cable system would have 1/3rd (33%) of the homes signed up as subscribers at the end of 5 years of operation.

If each home passed cost \$1,000, and only 1 home in 3 subscribes, the actual cost per *subscribing* home becomes \$3,000. Obviously spending \$500 to reach a subscribing home by satellite is far more economical than spending \$3,000 to reach it via cable.

However, when digital is factored into the equation, the real satellite cost becomes at least \$1,000 per home. And that is for a home with only one television receiver. If the home has 2.7 television receivers, as is the average in some metropolitan NZ regions, the cost becomes \$2,170 per home just to equip the home for universal access to all TV channels by any TV set in the home.

The cost of cable versus the cost of satellite suddenly becomes much closer on a per home basis. Something very significant has happened to the financial model that pits satellite against cable, here. And it becomes even more alarming for the satellite camp when the question of programming security is asked. Satellite depends upon conditional access security systems which after 2 years at DirecTV and 1 year at South African Multichoice were broken by pirates. Because satellite transmits through the air and anyone with appropriate equipment can receive the services in their backyard, gaining an upper hand to combat piracy is virtually impossible. Anyone with a satellite dish at their home applying the appropriate piracy technology (now freely available on numerous Internet sites) can watch the programming free of charge. If Sky's digital service loses even 10% of its customer base to piracy, the combination of lost revenue plus increased security costs send the cost per household served to well over \$3,000. That's what has happened in the USA and South Africa. There is no reason to expect it would not happen in NZ as well. By comparison, while it is technically possible for a non-subscriber to hook him or herself to a local cable network and to steal the

programming, the chance that such an act would go undetected is very minimal. Cable loses revenue to piracy, but only through mismanagement of subscriber connection policies.

The final judgement, then, as to whether satellite or cable is the least costly system to deliver pay TV programming to a universe of subscribers is hardly a foregone conclusion. Cable looked like a loser here as recently as 1997. Satellite looks much less like a winner in 1998.

Looking Out Five Years

Sky's challenges are not unique; every digital DTH provider now operating has faced the same problems. None to date has solved these IRD problems (either software compatibility or pricing). How far down the road must we go before these issues do come to logical, marketplace conclusions?

It is easy for a DTH provider such as Sky to insist that it have something unique in its IRD software to prevent other IRD models from working in their universe. Unfortunately, it takes a commitment of 100,000 IRD units to a manufacturer to get a customised software design. And in the end, the difference may be quite small at the consumer (final user) level. The much reported Australian Aurora platform, for example, involves an initial commitment of 15,000 IRD units. Aurora sees this IRD as a dealer sale item; Optus (Aurora platform operator) sees the IRD as something they buy from a supplier (Comstream is the current choice) and then sell to dealers. In this situation, Optus is buying at one price (US\$350) and reselling in Australian dollars (\$750 - \$800) after adding a 30% mark-up.

Taiwan manufacturer Sun Moon Star currently offers a US\$285 price at the 100,000 order level. The difference here is US\$65 for a change from 15,000 units to 100,000 units. The Australian experience provides us with significant guidance as to the type of decisions Sky faces when purchasing nearly identical product from the same manufacturers at the same point in time.

When an IRD (any IRD) must be added to every TV set that will access the satellite TV package, the entry costs at the consumer level become unmanageable. A receiver that has been customised to do only one thing (such as only access Sky and not others that are available to the consumer with a dish) at the demand of the programmer becomes an even harder "sale" in the marketplace. When consumers figure out they are spending \$600 to buy a "digital decoder thing" that has only one purpose in life (to receive only Sky programming), Sky's marketing challenge just went up a notch.

Certainly some of the presently high cost of an IRD is related to the "customising" of the IRD to one particular service provider. A programmer that insists on "his own decoder box" not only is increasing the cost of the decoder, he is also risking that consumers will not learn the box is useless for other (undefined) "future" services. It has been a carved-in-stone philosophy of all Rupert Murdoch DTH platforms that their IRDs will work only with their programming platforms (and of course Sky's move to digital follows the Murdoch corporate game plan).

Recently BSkyB announced they were *considering* allowing their new (BSkyB) decoder to access "free to air", non-Murdoch programming provided the buyers of the decoder subscribed to some minimum level of Murdoch provided programming. In other words, to get the FTA, you *first* must subscribe to the BSkyB package. All of this can be done with software. That a similar approach might be utilised in New Zealand by Sky, to allow reception of FTA terrestrial services (TV 1 - 4) through the Sky decoder is a possibility.

Ultimately, but probably not within a five year time span, all of this IRD nonsense has to go away as TV receiver manufacturers integrate the digital satellite receiving function into the basic television set. Prototype, for display purposes, TV sets with the digital IRD built-in have been shown at recent American electronic shows. For that to be possible, some "standard" approach to both digital transmission and digital conditional access routines must be put forward and adopted by the programmers. That will end the present "war of standards" that is the root of all major hardware problems now faced by Sky, Galaxy, Aurora and the dozens of other satellite programmers world-wide.

This is not likely to occur within five years - some say it will not happen as long as Rupert Murdoch remains in control of his empire. But it *will* happen and probably within the five to ten year time frame ahead of us. In the interim, the equipment Sky buys to implement digital and the equipment consumers are offered to receive digital will be a temporary fix with a very high price tag attached.

Unresolved "Details" in Sky's Transition to Digital

✓ Multiplex format: Sky has yet to announce selection of an MPEG multiplex (programme bouquet creation system) provider. Until the multiplex provider is determined, no decision can follow for the IRD units.

✓ Selecting too early, getting too little. Digital TV is reinventing itself every 15 - 18 months. Whatever Sky selects for multiplex provider and IRD supplier today will be the wrong decision 15 months later. In 5 years, Sky will have to replace everything - at their expense.

✓ IRD source: Once a multiplex format is chosen, then Sky can concentrate on selecting an IRD which suits their needs. In Australia five firms provided sample IRDs for selection by the Optus Aurora platform. Early in January, Comstream was selected to provide a consumer level IRD equipped with Irdeto conditional access (CA) at a price reported to be around US\$350 per unit.

✓ Programme content: Someplace between 8 and 15 separate programme channels can be compressed onto a single satellite transponder; the exact number will depend upon the multiplex system chosen by Sky and the content of the programming. Sky has only one satellite transponder available to them initially which means some number between 8 and 15 TV programme channels can initially be sold. Which "8" (or 15) becomes a marketing decision. The second transponder (actually the one they are now using to deliver Sky Sport and Sky Orange in analogue format) will become available to them from 3 to 6 months after the first digital transponder is turned on. Within ANOTHER six months Sky could have from 16 to 30 digital TV programme channels in operation. Their third transponder, bringing another 8 to 15 additional programme channels, will not be available until midyear 1999. Sky's selection of which programming channels to launch with, which programme channels to add later on, will directly affect their initial success in the marketplace.

✓ Use of terrestrial channels. As long as IRDs cost upwards of NZ\$600, and each TV set in a home requires its own IRD, the attraction of adding terrestrial channels 1 - 4 will remain marginal. How the terrestrial channels will be compensated, whether NZOA will fund some of the IRD household costs (in the Australian model) remains unanswered.

✓ Commercial customers. Ideally for Sky, each commercial (motel, hotel) customer would totally convert to digital, rewire their premise for satellite signal distribution, and install an IRD in each room. That a 15 unit motel is likely to spend \$9,000 for IRDs and several thousand more to rewire its facility is unrealistic. How Sky can maintain its high penetration of commercial facilities facing the realities of digital costs is a major challenge.

✓ IRD subsidy. If Sky elects not to subsidise the IRDs (and other required satellite reception equipment), consumers will be facing something in excess of \$1,000 to become satellite TV users. If Sky elects to partially subsidise the initial cost (as in the BSkyB model), approximately \$500 per household must be set aside out of Sky reserves to fund the subsidy. A universe of 10,000 homes would require \$5 million; 100,000 homes \$50 million. Proceeds from Sky's recent stock flotation could be used for this purpose but at some point the subsidy has to be paid back. The crucial question is when, and how? If Sky elects to follow the Australis/Galaxy subsidy route and subsidise virtually the entire cost of the satellite installation, the principal remains the same - only the numbers get bigger; 10,000 homes subsidies at \$1,000 each becomes \$10 million; 100,000 homes subsidised at \$1,000 each becomes \$100 million. Still to be faced - somehow, someday, this money has to be recovered. When and how?

✓ Multiple IRDs. Homes that "convert" fully to satellite television will require one IRD for each TV set. The extra cost of the IRDs (today and for the foreseeable future - at least NZ\$600) is a major hurdle to be crossed. Add to that - the cost of wiring each home with "satellite compatible" coaxial cable distribution systems.

✓ Sky's "unprotected" transponder status. Sky's agreement with Optus currently does not provide Sky with a guarantee that should one (or more) Optus transponders fail, Sky will be moved to a replacement transponder. Sky has "unprotected status" with Optus which means a transponder user with a higher class of service ("protected") could force Sky off of one (or more) of its transponders if a protected transponder fails. **Bottom line:** Any transponder loss on any Optus satellite puts Sky at risk of losing one or more of its contract channels. Sky could upgrade its status, for a higher monthly cost. Or continue the risk that if a transponder fails anyplace in the Optus world, they could be adversely affected with less than 24 hour notice.

TECHNOLOGY BYTES

...BITS and BYTES you may have missed in the rush to make a dollar ...

January 21, 1998 ♦ VOLUME 98-1-44

Satellite TV & Radio

Star TV Asia bouquet on AsiaSat 2 (3900 Vertical, 28.100 and 3/4) dropped conditional access January 14 and allowed FTA of this bouquet until January 18th. This may not have been a mistake. STAR TV had kept their AsiaSat 3 marketing plans under close wraps (see following report) and was known to have considered making available a wider grouping of services as a lead-in to major promotional push to digital service on As3. Included in the temporary FTA bouquet: Sky News London, a sports contribution feed, music Channel [V], Star Movies Japan (NTSC with Japanese subtitles on primarily English language films) and Star Plus Japan (which is now largely in Japanese). Hyundai receivers handle this bouquet with no difficulty, Nokia receivers require red screen menu software additions for glitch free reception, DVM/NTL receivers are the commercial receivers of choice. On January 18th, bouquet again partially closed up with Sky News, Star TV Japan remaining FTA.

AsiaSat 3 failure as reported in CTD for January 19th is sending score of would-be programmers and primary programmer Star TV back to the drawing boards. Star TV now must be concerned that its "flagship" delivery service, AsiaSat 1, will continue to function well enough through the next 15 to 24 months to "hold on" until a replacement for AsiaSat 3 can be built and launched. AsiaSat, the corporation, has contract with Star TV that prevents any other "international broadcaster" from leasing transponders on AsiaSat 1. That contract term was to terminate when AsiaSat 3 replaced As1 at 105.5E and a sizeable number of new "international" broadcasters were believed waiting to compete with the Murdoch Star services from 105.5E. As1 was launched in 1990, has a projected 9 year life but the exact health of the satellite as well as the status of all-important hydrazine flight fuel is not public.

Comstream, apparent first-round winner of Optus (Aurora) project receiver tender, may have a problem supplying Irdeto equipped receivers as called for in bid request. Irdeto is claiming they have not yet licensed Comstream to use their conditional access system. Optus in soliciting bids for Aurora receivers had one unusual wrinkle to bid requirements: Receivers were to be priced "into store" meaning the net effective price to Aurora dealers for the receivers. Aurora, unlike Galaxy or any announced plans by Sky in NZ, wants to create nation-wide "installing dealer network" of firms to handle their viewer orders, does not want to become mired in the installation end of the business which ultimately spelled doom for Galaxy. Unusual language in Aurora bid request addendum states, "For each drop of one cent in the value of the Australian dollar against the US dollar, the retail price of the (chosen) receiver will change A\$11.80." The Australian dollar has floated between 60 and 66 cents to the US dollar the week of January 12-17, which means the pricing for the intended receiver changed \$70.80 just in that one week alone. And you think you have problems balancing your cheque book!

GWN (Perth regional satellite broadcaster) service is not available in Perth proper nor within range of Perth TV terrestrial transmitters. Service is considered "most desirable" of all satellite feeds because of unique arrangement that takes programming from Australian terrestrial networks as well as independent service not available elsewhere in Australia. Of interest - early SA D9234 receivers being sold for GWN's PAS-2 service feed also receive the Imparja satellite feed on PAS-2 Ku as well.

UIH (majority owner of Saturn in Wellington) has notified would-be cable television and other users of their proposed multi-channel feed from North America, "The project has been placed on a back burner at this time. Because of the unfortunate state of the pay TV industry in Australia, our plans to ship up to 18 channels of programming to cable systems in the Pacific are now indefinitely delayed." Saturn, and other NZ cable operators, had been anticipating this programme package for nearly two years.

More Numbers from Echostar - North America's Third Largest DTH Provider

In report to SEC, Echostar says their DTH subscriber base of 820,000 customers should grow by a managed 230,000 in the last quarter of the year. Echostar reports they are spending an average of \$300 to acquire each new subscriber, the churn is running at a rate of 14.4% per annum (churn is the people who subscribe and then describe - running at 1.2% per month), and, average monthly revenue per subscriber is now \$39.50 as compared to \$34.50 one year ago. Total subsidy costs to date: US\$67.5 million.

Galaxy/Australis laid off an additional 80 employees nation-wide the third week in January; rumours claim firm will accept no new orders for home installations after January 31st. Whether this means Galaxy is freezing subscribers at present levels as of January 31, or it will be transferring the installation business (and orders for same) outside of Galaxy as of 1 February is not known. Galaxy is believed to be ready to announce deal with Australian terrestrial antenna firm to take over all MDS systems; a similar deal for DTH subscribers could be following.

Optus has appointed a new head of pay TV and multimedia and he claims Optus is poised to launch a direct to home pay TV service. Dan Hagans comes to Optus from regional service provider Austar, claims the firm will be adding additional programming on their cable service shortly and with relation to satellite, he notes: "Optus has all of the tools for satellite. It has the uplink, the transponders, and it has the customer services and programming." He also indicated that there would be one more shot at joining forces with the Australis/Galaxy DTH platform before Optus reaches a non-reversal position of activating their own satellite delivered pay TV platform. Optus has been testing a 16 programme channel capable transponder package on Optus B3 (12.626 horizontal, 29.473 and 3/4) for several months. Of late, most of the turned-on programming channels have been carrying test cards although The Disney Channel has been running (FTA) as well. Of interest outside of Australia, this Optus transponder is uniformly 1 to 3 dB "hotter" than the Galaxy transponders, not enough to make a serious reduction in dish size possible but enough to add much needed extra margin in fringe receiving areas.

CNBC merger with ABN, long rumoured, becomes official February 2 as CNBC Asia will be survivor of amalgamation. ABN's primary owner, Dow Jones, has agreed to merge with CNBC world-wide and its respected financial news service will become a part of the regular CNBC programming schedule. CNBC gains world-wide rights and TV access to all Dow Jones editorial output and resources. Cable operator TCI will trade its equity interest in ABN for a subordinated interest in the new operation. CNBC will headquarter in Singapore (as did ABN) and the new CEO of the CNBC Asia operation will be Paul France from ABN. In a similar transition in Europe, Dow Jones EBN will become CNBC Europe with headquarters in London. CNBC + ABN will have 9 million full-time homes on line plus an additional 30 million homes that receive part day service.

Latest FTA version MPEG receiver to be introduced in Europe comes from Strong, a maker of bargain priced analogue receivers. Unit is model 4000, has reported SCPC/MCPC Msym tuning range of 4 to 34. True origin of unit? Probably from Taiwan, a rebadged Prosat 2000.

Exxtasy (adult triple X) service delivered through 177E Ku MCPC of Taiwan's Space TV Systems is not only greatly reduced in signal level in New Zealand (see SatFACTS January 19, p. 18) but may also be no longer available "out here" as a result of corporate shake-up. Exxtasy is brand name only, ownership of adult movie service is buried in Caribbean Island corporation with offices in Montreal. Exxtasy has notified potential distributors in Pacific, "We are involved in a corporate ownership change and the new owners will want to renegotiate their own pricing and distribution agreements when this is finished."

An EC (Commission) investigation into the contractual arrangements negotiated by Murdoch's BSKyB for the purchase of digital IRDs for the new 200 channel BSKyB service will not delay the introduction of the planned service. Production of the set-top boxes was due to start this month but the EC wants to know more about how BSKyB's planned consumer subsidies will function before it grants approval to the project. BSKyB had determined through marketing studies that the maximum amount consumers would be likely to pay for the digital conversion of their existing analogue reception packages was 200 pounds; the broadcaster plans to somehow subsidise the balance of the real costs to entice early conversion to digital. The European Commission wants to be assured that the subsidy programme will not violate EC regulations.

Technical problem not yet resolved. SCPC Ku band digital transmissions require an LNB(F) with greater stability (as measured by frequency drift over time) than the marketplace is able to provide. Units available in small quantities command multi-hundred dollar (US) price in field where lower grade LNBs produced in high volume sell for under US\$40. Lower grade units work well enough for MCPC transmission (such as Galaxy provides to DTH viewers) but when the transmission bandwidth is narrowed up the stability of the local oscillator section of the LNB becomes critical. A low symbol rate on Ku band is, to date, quite unusual but this

A Family Affair

26 year old Lachlan Murdoch has been formally designated to succeed his 66 year old father Rupert as CEO of News Corp, subject to approval of Board of Directors. Designation was reported by Wall Street Journal to have "blessing" of Rupert's wife and 3 of 4 Murdoch children. Lachlan is Chairman of Australian based News Ltd as well as responsible for TV interests in Asia and Australia. Daughter Elisabeth, 29, is executive with BSKyB in UK, son James works for News Corp out of New York City. Fourth child, a daughter by a previous marriage, lives in England and is not involved in Murdoch family operations.

is precisely what the latest PAS-2 Ku services from ABC, GWN and Imparja are operating. Look for sudden interest in filling this product void by Taiwanese manufacturers over next 90 days; price range around US\$100 when it is all sorted out.

US government will allow non-US satellite operators to directly serve US customers with DTH and other forms of programming and data exchange, provided the host country of foreign competitor also allows US programmers to reach customers in their country. Previously, foreign telecasters and radio broadcasters had to seek specific FCC approval to serve US homes. Most non-US programmers have gotten around this limitation by forming US based company to distribute their programming to US viewers through US satellites.

AT&T's US\$137.5 million investment in US DTH pioneer DirecTV (owned primarily by General Motors subsidiary Hughes) has been sold for US\$161.8 million, back to Hughes. AT&T had deal to market DirecTV through phone stores nation-wide; a plan that apparently did not work out well enough to encourage AT&T to stay in the DBS business. The telephone giant had an option to purchase up to 30% of DirecTV but it passed on that opportunity. About being a marketing agent for DirecTV, AT&T spokesperson said in explaining sell back of stock: *"DBS is not an item you can sell over the phone. It's a relatively big ticket system. People want to see and touch the equipment, you know - kick the tires. They can do that (better) at a consumer electronics retailer."*

DirecTV sold more than 200,000 new subscribers in month of December alone, they report. This has caused a critical shortage in home DBS equipment as major producer Thomson has been operating Mexican plant over weekends to attempt to keep up with demand. Competitor Echostar reported they were also in a hardware back ordered state primarily because of some long lead time items that go into DBS receivers that require 4 months or more advance warning.

Canadian based DBS programme supplier AlphaStar may rise from ashes under new ownership. Assets (not liabilities) of Alphastar were sold by bankruptcy court for US\$72m in August to Champion Holdings. Firm retained world-class Connecticut uplink site, is renegotiating for transponders with original supplier Loral SpaceComm, and has hired portion of former employees back. AlphaStar had 51,000 subscriber base when it quit service in August and each of these former subscribers owns a unique IRD which is not compatible with any other satellite pay TV system in North America.

Fox Sport Net and other Murdoch operated Fox satellite services in North America have ordered Wegener's model 4000 Unity MPEG-2 satellite receivers. Turner Broadcasting has selected Wegener DVR2000 digital receivers and DVT2001 digital encoders for CNN use (yes - digital distribution of CNN is coming).

Launch of Echostar 4 Ku band DBS bird, on Russian Proton rocket, scheduled for late March / early April is likely to be delayed until query into failure of Proton launch of AsiaSat 3 is completed. Related: Echostar 1/2 birds currently providing DTH service into Americas, are likely to be replaced with new "4" satellite after launch and check-out; 1/2 would then be moved to 148W location for possible use to Alaska, Hawaii, Mexico and western USA. In the "hope springs eternal" department - off chance that an Echostar Ku band DBS bird at 148W might "leak" usable levels of signal into Pacific continues.

Digital TV & Radio

First generation HDTV consumer receiving equipment on display at annual (US) Consumer Electronics Show included Philips 64" wide screen rear projection HDTV receiver with 1,080 lines of interlaced video as well as a stand alone digital to analogue converter from Matsushita and a Trinitron flat screen HDTV receiver from Sony. Hitachi and Thomson are collaborating on first generation 60" widescreen projection sets with an initial price tag of US\$7,000.

How expensive will digital TV conversion be? Small market TV station (90,000 TV homes) in Duluth, Minnesota (USA) KBJR-TV says it will spend (US)\$8 million for conversion to digital transmission. The "\$100 per home" cost has become a benchmark for US broadcasters now making the changeover which in New Zealand terms computes to more than NZ\$187 million nation-wide.

Not good news for US digital TV broadcasters nor for digital home TV sets. Statistical Research Inc. study makes dire projections of growth of HDTV and digital SDTV (standard definition digital TV): 35% of all homes buying digital TV in first ten years would purchase SDTV rather than HDTV sets; HDTV sets would only penetrate 8.5% of all homes in same ten years; balance of households would simply purchase (US\$200 price range) set-top digital to analogue converter to receive digital TV broadcasts on existing analogue low definition receivers. Citing anticipated high cost of digital TV receivers for home use (\$1,000 more than analogue sets for SDTV, up to \$6,000 for HDTV sets), SRI believes the transition to HDTV digital will be much longer and much slower than forecast by broadcast industry.

European study by UK's Datamonitor projects digital set-top boxes (in the form of satellite IRDs, and, terrestrial IRDs) will sell 1.1 million units in Europe in 1998, climbing to total market base of 13.4 million by 2002. Primary markets will be France (which currently has more digital set-top units than the rest of Europe combined), Spain and UK. Spain is expected to be largest market in 2002, followed by France and UK. Study

3-1/2" Floppy Days Numbered

The now ten year old diskette which fuels the spread of personal computing technology is approaching antiquity while high tech replacements are in the wings waiting to be introduced. Floppies have ability to store 1.44 Mbyte of data; newest proposed replacements go as high as 200 Mbyte. There is a price of course. 1.44 version has wide data tracks (0.2mm) and slow spin rates (300 rpm) which combine to greatly reduce not only the amount of data per floppy but the transfer rate. Real time full motion MPEG-1 format video, for example, requires far more storage room and much greater transfer rates than 1.44 floppies can provide. Super Disc by Panasonic claims 120 Mbyte capacity; HiFD by Sony + Fuji says 200 Mbyte. Super disc reduces track width to 0.01mm, shifts RPM to 720 and creates a data transfer speed of 560 kilobyte/sec. HiFD reduces track width to 0.009mm, spins at 3600 rpm with a transfer rate of 3.6 Mbyte/sec. This would allow up to 30 minutes of MPEG-1 video on a single HiFD floppy. Bad news is that none of the new PC disc players presently designed are backwards compatible which means anyone moving up to a PC with the new drives would not be able to use them with older format (1.44 Mbyte) floppies.

forecasts French growth will reach region of 16% and stagnate; Spanish growth will be fuelled by intense marketplace interest in soccer and availability of soccer coverage through digital bouquets on satellite. UK growth is built around projection of consumer acceptance for the 1998 to-launch BSkyB digital package and later in year launch of terrestrial digital services.

Korea and Canada have formally adopted the American ATSC HDTV transmission format. Battle for "standards recognition" now underway world-wide is reminiscent of 1950's effort to push NTSC over PAL for colour TV format. In the end, with two or more standards operating world-wide, there is no "standard."

Computer IC manufacturer Intel is building experimental digital TV transmitter system at plant in Santa Clara, California. Company believes it must "get its hands dirty" and "move out of theoretical models" if it is to make meaningful advances in the marriage of data transmission to digital TV transmission using same physical facility. FCC approval has been requested, Intel will operate on four separate VHF and UHF frequencies to determine the differences (if any) in wave propagation and interference sources over wide frequency range.

Intel has come out contrary to previous computer software groups position that all standard definition digital TV be configured so as to be able to be displayed on normal PCs. Microsoft and others had insisted method of creating SDTV and HDTV must be compatible with existing "standards" for personal computers. Intel now says it has developed a new chip that converts all DTV formats to display on video monitors of any capability. Intel chip uses Hitachi developed "all format decoder" technology. Intel says that with new chip technology, it becomes immaterial which digital format is used by transmission source; the chip will recognise virtually any digital scheme and convert output to something that is compatible with virtually any monitor now in use. How much will this cost? Intel suggests basic cost of TV set will go up by US\$50 initially when chips are included resulting in 10% rise in average retail price. This has potential of being major breakthrough in standard wars that have wreaked havoc on TV broadcasting industry.

DBS programmer USSB plans HDTV service by end of year, probably built around HBO movie service offering now being readied for announcement. USSB recently rearranged its satellite transponders to make room for HDTV transmissions. IRD supplier Thomson says it will have HDTV model available for marketplace by end of 1998 as well.

Consumer Electronics

DVD correction. CTD for November (p. 10) reported on early adopter DVD experience. We said DVD player was purchased in Australia was designed for Region 1 (USA/North America) and that is incorrect. Player was actually Region 6 (Chinese) which is NTSC/PAL functional only because that was the design choice with the particular Panasonic A300 model referenced. US Region 1 players are typically NTSC only, would not be the best choice for a South Pacific user. Of interest, Region 2 players (Europe and Japan) are also NTSC/PAL functional and it appears for now only the Region 1 players are single-playback standard (i.e., NTSC). "Our" Region number is 4, for reference. The first (Roadshow) (Australian) PAL release went on sale in mid-November as reported for CTD November.

DVD player versatility. Pioneer offers two player models between US\$1,000 and \$1,700 capable of playing both older format laser discs and newer format digital video discs (DVD). Target audience are those who already are laser disc owners, see logic for having both formats combined into single 'box'.

Compatible DVD audio standard in Europe, adopted in consensus meeting in September, has fallen apart. DVD Forum members (10) voted 8-2 to rescind September decision that would have made MPEG-2 format

THE SAGA OF SATELLITE IRDs - Report One

It must be contagious. First the Australian pay TV world, represented by DTH and MDS operator Australis/Galaxy plus cable operators Foxtel and Optus Vision, seem jointly and separately to have made every operational and tactical mistake known to the pay TV world. Plus a few that are totally unique to Australia. Now along comes the supposedly pure and clean RABS or outback TV service and its long planned conversion from encrypted B-MAC analogue to digital transmission.

The RABS service must abandon analogue transmissions on the Optus satellites to make room for the explosive growth of digital format transmissions. With analogue, each Optus satellite transponder allows a maximum of two separate TV programmes to be carried. With digital, that number can be as many as ten. Optus has key transponders which could be sold to new digital users tied up with old fashioned analogue and Optus needs to get the existing analogue users converted to digital simply to accommodate the new users standing in line.

To do this, Optus (the satellite company) has created something they call "Aurora." The "Aurora Platform" was intended to be the digital future of television (data) transmission through Optus, the satellite carrier. Optus figured it could gradually slide into Aurora, gradually move existing analogue users (such as the Australian ABC, SBS and regional TV services) to Aurora and gradually free up satellite transponder space which could then be sold to new outfits such as Sky New Zealand (which, by the way, has been guaranteed access to its first digital transponder in May [1998] and the second one year later).

Aurora is an operational platform, a precise engineering exercise built around specific (readily defined) MPEG-2 (digital) transmission parameters. To activate Aurora, Optus first had to establish what the digital parameters would be, test to see they would function properly with the Optus B1 and B3 satellites, and then go into the real world to locate hardware suppliers who could build uplink (transmitting) and downlink (receiving) equipment capable of performing to the adopted "standards."

There are three general categories of users presently with analogue who will be impacted by this change:

- 1) Commercial and public broadcasters (ABC, SBS, TAL, GWN, Imparja et al)
- 2) Private network operators (horse racing, educational)

- 3) One-off transmissions for special events that require some form of secure transmission.

All of these categories presently use the 1980's B-MAC analogue encryption technology or a variant. All will eventually end up converted to MPEG-2 or some variant of digital. To facilitate this change, Optus went to the present analogue users and asked for their input. It is perhaps unfortunate that Optus approached the present users not as customers or even as partners in a great technical operation, but rather as serfs being told how, what, when and where the changeover was to be accomplished. In other words, Optus mostly *talked to* and seldom *listened to* the users, perhaps forgetting for the exercise that the users send them cheques each month to pay the bills and salaries of Optus personnel.

So shortly, perhaps not so shortly, the "Optus attitude" drove the present users to a direction which two years ago would have been unthinkable:

"Why should we use Optus at all???"

What Optus either overlooked, or considered unlikely to happen, did happen. Because of Australian regulations that prior to July 1, 1997 forced all domestic users of satellite within Australia to utilise Optus (and ONLY Optus) - Optus apparently believed it unlikely that any (as in ANY!) users would actually go someplace else for their satellite connections. Optus had been the only game in town since the 1980s (early 1980s at that) and they had simply forgotten how to function in a competitive environment. The "WE are Optus!" mindset apparently permeated even the engineering level technical decisions.

In an increasingly competitive world, where bottom line profit and loss has become even more important than saluting the Australian flag, enter PanAmSat and other new satellite carriers. The new entrants were quick to massage the decades old sores opened by a callous Optus that operated as "WE are Optus!" for too long. And PanAmSat with their Australian (New Zealand) Ku beam capabilities on PAS-2 was quick to offer "deals" to Australian service providers which put money in the bank way ahead of saluting the Australian flag. Western Australia private telecaster GWN was to become a symbol of independence from Optus.

IRD SAGA - Report One (continued)

GWN was the second former Optus user to "break ranks" and head for PanAmSat. The first telecaster, Northern Territory's Imparja, announced in August their intention to move from Optus to PanAmSat and actually began testing on PanAmSat in August. In a letter released in September, Imparja CEO Corallie Ferguson wrote:

"Imparja is planning to start a digital service early next year. It will be carried on the PanAmSat (PAS-2) satellite (Ku). For around two months we will operate jointly on Optus (in B-MAC) and PAS-2. By mid-February, we plan to cease B-MAC transmissions.

"One of the reasons why Imparja is moving to PanAmSat is the possibility of forming an alliance with a Pay TV operator providing national services."

GWN chose not to be "as public" as the Corallie Ferguson letter, but still notified equipment installers and others that it would begin testing its own PAS-2 service feed on 1 December (which it did within days of that date).

On January 8th (1998) Optus apparently realised it was fighting a real battle with real chances it could lose more customers to PanAmSat. Optus National Media Sales Manager Jeff Davies wrote and widely circulated a letter on that date which drew a line in the sand and reported in carefully chosen words, *"So far, GWN has not agreed to co-operate with Optus in (the Aurora) initiative."*

Davies took two pages and said:

"There has been some confusion regarding the digitalisation of broadcast signals in WA. Optus would like to appraise you and your clients of Optus plans for services in WA.

"Optus intends to continue to deliver a GWN B-MAC signal on Optus B3 satellite after GWN terminates its contract with Optus on January 31st 1998. This signal will be provided until Optus' own digital conversion in WA is complete. This is expected around May 1998. Optus has received advice from several independent and well-qualified sources that there is nothing in the current legislation that prevents Optus from providing the GWN signal in this way. Optus does not expect that there is any technological impediment to prevent Optus from re-broadcasting GWN, and a number of workable options are available to Optus.

"Optus also intends to provide a good quality GWN DTH signal in digital form on the Optus Aurora platform, which may also be suitable for self-help re-broadcast. A professional Aurora compatible decoder can be configured to handle more than one TV signal and it may be more convenient and lower cost (especially as a second satellite dish would be required [for GWN via PanAmSat]) for self-helpers to do this. Note that the ABC signal provided by GWN will not be suitable for re-broadcasting."

Some explanation at this point. GWN's move to PanAmSat only makes economic sense if all of the GWN satellite receiving locations are able to receive GWN, ABC and possibly other TV programming from the single dish pointed at PanAmSat 2. GWN by itself on PAS-2, with ABC and others off on Optus B3, makes very little economic (nor engineering) sense. GWN first attempted to convince ABC to share their PAS-2 service (multiplex, in the talk of the digital people). ABC ultimately decided not to do this. So GWN said, in effect, "Well - ABC is a free to air signal and we don't see any problem with simply taking their free to air signal and including it inside of our multiplex on our own initiative anyhow. Even if ABC won't share part of the cost of this." The logic is that users of GWN will indeed want ABC as well as GWN, and both should come to them from the same satellite feed (as they now do with B-MAC analogue). And so the GWN multiplex (bouquet) when it began testing early in December did in fact have a space set aside for the ABC service.

Now, more than a month later, we have Jeff Davies at Optus saying, in response, "OK - if you want ABC and GWN together, then we will include a GWN feed within *our* western Australia multiplex as well. And there is nothing in the law that can prevent us from doing this."

Fair dinkum. If GWN can provide ABC on PanAmSat, why not Aurora providing both ABC and GWN together on Optus?

A most logical result: "If you piss in my front yard, I will retaliate by pissing in yours." That Optus is telling people, "Note that the ABC signal provided by GWN will not be suitable for re-broadcasting" very possibly has no defensible technical accuracy. Here, Optus is basically saying, "WE know how to provide a broadcast quality signal, but those poor fools at GWN and PanAmSat do not." Right on.

IRD SAGA - Report One (continued)

At this point in his letter, Davies goes on the positive offensive. He wrote:

"Note also that 5 independent ABC services, being Qld, Nt, SA, WA and SE (NSW) will be available for WA viewers to choose from at *all* times when using Aurora."

Now THAT is an interesting statement. Literature issued by the RABS Project in late October goes to some length to explain that DTH viewers in each portion of Australia will have access "*only* to the ABC service intended for *their* region of Australia." The RABS material goes to some trouble to explain that a new "SMS" (subscriber management system) will determine which ABC feed each Australian DTH viewer will view. Davies contradicts this by holding out the promise that DTH viewers using the Aurora platform will have not only the WA ABC feed, but 4 other ABC feeds as well.

Davies goes on to say:

"Optus is currently providing an SBS WA service into existing WA B-MAC decoders, and intends to continue with this until the digital conversion in WA is complete, subject to capacity restrictions. There are two high quality SBS Eastern states contracted to be on Optus Aurora, and plans for an SBS WA Aurora service has not yet been finalised."

This interprets as follows. SBS WA is still considering an offer from GWN to be included in the GWN PAS-2 feed. Optus suggests (but does not confirm) that in the worst case, Aurora viewers of ABC (+ GWN) will 'at least have access to two high quality SBS Eastern state services - even if the SBS WA service does not end up using Aurora.'

And then there is the matter of DTH equipment. A GWN viewer selecting the PanAmSat feed must purchase a new satellite dish (the present Optus analogue service dish might be used, no guarantees) plus LNBF, cable and of course the dastardly IRD (integrated receiver decoder) that is at the root of this problem. Virtually any service (such as GWN) electing PanAmSat immediately falls into bed with Scientific Atlanta. Why? SA is the service provider of record for PanAmSat and when you marry PanAmSat you get SA as an automatic bed partner. To service this (and other, similar, programming services) Scientific Atlanta has brought out their new model D9234 receiver. The D9234 is a consumerised version of the 9223. The Australian user price is \$1,370. The D9234 has been offered through a recently established chain of SA "distributors" with varying levels of one-time discount. For example, if the DTH buyer is a registered viewer of GWN, has received a \$750 government rebate certificate, and meets other criteria, the actual swap-out cost of the D9234 is under \$300. It has never been explained where the government \$750 rebate originates.

Aurora only reached a decision on *their* IRD after January 1st. Five receiver suppliers had originally been in the running: Pace, Hyundai, Nokia, UEC/Panasat and Comstream. Aurora has elected to install an uplink system from Divicomm and that created some special problems. The Divicomm MPEG-2 signal is strangely not totally DVB compliant - meaning receivers that will work with the Divicomm originated multiplex must possess unique software decoding capabilities. This factor was not recognised by any of the receiver suppliers until mid-December when, after testing by Optus, all receiver sources were told their submitted test units had failed. Investigation revealed the unusual data bit stream from Divicomm was the culprit. At that point only UEC/Panasat and Comstream elected to stay in the race. The two remaining suppliers then went to work on resolving five data stream error problems, of which an audio glitch was most pressing. Shortly after January 1, Optus advised it was selecting the Comstream unit as its base receiver although admitting when it did so that unresolved "glitches" still remained. The made-in-Wales, plastic cased, consumer level Aurora receiver from Comstream has never previously been produced so Aurora is buying a first generation device. This agitated other receiver suppliers who were offering third (and in one case, fourth) generation receivers which had the benefit of being generationally improved. About the receivers, Jeff Davies in his January 8th letter wrote:

"Aurora decoders are expected to be significantly less expensive than SA decoders and Optus advice to consumers is to hold onto their RTIF voucher and wait until around May 1998 to make an informed decision. It is not necessary to go to the expense and inconvenience of repointing dishes away from B3."

Aurora might well be able to sell their decoders "for significantly less" as the bid price to Aurora from the original receiver suppliers ranged downwards from US\$350.

IRD SAGA - Report One (continued)

Davies' January 8th letter was apparently issued under some degree of pressure to "get the letter out" before the details were sorted. In fact, he wasted no time between the decision date at Optus to buy Comstream receivers (January 6) and his January 8th letter. Still, there were details not yet worked out. Davies then wrote:

"The current foreign exchange rate fluctuations will obviously affect the price of most imported goods. Optus will shortly announce details of a new initiative to minimise the changeover cost for WA DTH consumers who use their RTIF (government rebate) voucher to buy an Optus Aurora compatible decoder. Stand by for further exciting information."

To further smooze the satellite equipment dealers who represent the consumers, the Davies letter then wandered about the pasture making isolated one sentence points which occurred in random after market fashion. He said:

"One of the key differentiators of the Optus system is that it is technically compatible with the satellite Pay TV system used in Australia (also on Optus B3) and the Telstra/PanAmSat system is not."

Certainly the Telstra/PanAmSat Scientific Atlanta IRDs are not technically (operationally) compatible with the present Galaxy/Australis pay TV system which utilises the PACE DGT400 receiver and the Irdeto conditional access system. That a Comstream receiver (also equipped with Irdeto) that has never been produced but designed to function with a unique Divicomm multiplex data stream will in fact be "technically compatible" with the Galaxy services is a not insignificant stretch of an unknown. Moreover, the present Galaxy policy is to NOT knowingly authorise any DTH viewers who are utilising any receiver other than a DGT400. Even if the Comstream receiver does end up being "technically compatible" with Galaxy, there is no reason to believe at this juncture Galaxy would accept new viewers using a Comstream receiver. Moreover, as Aurora will have its own Irdeto access card, and Galaxy has its own Irdeto access card, at the very least the consumer would have to take out one card and replace with a second card to switch between services. This message from Davies was perhaps intended to mislead dealers rather than consumers for he finishes by saying:

"Therefore, dealers will have a good opportunity to sell any stock of Aurora decoders in which they choose to invest, and minimise the risk of being left with decoders that cannot be sold anywhere else."

This is a pointed barb at the one-purpose Scientific Atlanta D9234 IRDs which, by the way, carry a "dealer margin" of a whopping A\$55 (after all of the work involved in distributing these receivers, the dealer is only able to earn that pittance amount). And finally, Davies dangles some carrots for dealers he hoped to influence with his letter:

"Optus now has confirmed contracts for the majority of the RABS services that were available on B-MAC, GWN so far being the only one that did not choose Optus. In addition the host of other clients who are going to use Aurora like the NSW Government Centrelink information service, the Qld Government's CITEC service and probably the WA Government's Westlink education service, means there is a large potential market for Aurora decoders, not just WA RABS DTH.

"Optus intends to provide DTH consumers with access to a range of additional video and audio services including the Horizon education video channel. Details will be announced in coming weeks."

All of this ugliness is not, of course, merely about which IRDs will be used by a consumer in Western Australia. Optus - the "national Australian" satellite carrier feels violated by the joint Telstra - PanAmSat - Scientific Atlanta plan to suck some of the former Optus business off to a "foreign carrier." Telstra has climbed in bed with PanAmSat because they need a satellite partner - and Optus is their competitor. Scientific Atlanta, the MPEG partner for PanAmSat, benefits automatically.

There is another scenario developing that certainly would throw a monkey wrench in both the Optus and Telstra satellite worlds. The plan: To build, from pre-built kits sourced in Korea and/or Taiwan, satellite IRDs in Australia proper. By building IRDs in Australia, a significant cost benefit (22% as a result of duty savings) would result. So the opening salvos have been fired by Optus at a relatively unimportant Western Australian telecaster. The balance of 1998 promises to be an interesting period for the Australian DTH world.

THE SAGA OF SATELLITE IRDs - Report Two

Consumer products supplier Hyundai Electronics Industry Co. Ltd. has been supplying Asia + Pacific region DTH users with their model HSS-100C version MPEG-2 IRD since mid 1997. What was notable about this is the "C" in the product number - which was Hyundai shorthand for "China." The Chinese market for digital IRDs began early in 1997; the result of 11 regional (provincial) sites going as a group to AsiaSat 2 with SCPC (single programme per carrier) television programming. The initial supplier, Philips of The Netherlands, was quickly jousting in the marketplace by Nokia, Hyundai and several would-be Taiwan suppliers. The "C" version HSS-100 had software inside which made it ideal for the Chinese SCPC provincial broadcasters, but not as ideal for Pacific region use. Still, it was a receiver, it did work, and the price was reasonable.

Like all IRD products, it is largely software dependent and the "C" unit had software version "2.05" in it. We would later learn that Hyundai began developing software for this version on April 19, 1996; a date we shall return to.

The HSS-100 uses a pair of (E)EPROM chips to hold the operational software. Hyundai has called them the "odd" and "even" chips from day one. The chips plug (rather than solder) into the circuit board, and it would turn out the base chips are commonly available (without software) in the world-wide electronics marketplace. As they pull out rather than desolder, it followed that sooner or later some adventurous individual would take the chips out and attempt to reverse engineer the software they contain. Software in this case is machine language instructions written by Hyundai.

As sales for the HSS-100 grew in the Pacific, it became increasingly obvious to Hyundai that a modified version of software was desirable. By late September, version 2.25 was available and there followed a rush on the part of early Hyundai users to convert their version 2.05 to version 2.25. This was facilitated by the removal of the "odd" and "even" chips which were then replaced with identical chip-stock loaded with the new software. Users routinely paid up to \$80 (A or NZ) for this "upgrade."

Alas, several "glitch" (malfunctioning) problems remained even after the 2.25 version software. By mid-December, Hyundai had released version 2.26 but of interest, they made every effort to NOT publicise the upgrade (2.26 fixes BBC, EWTN [NTSC] audio problems). Perhaps fearing users would object to having yet a third software version following so closely on the second, they elected to simply keep it quiet.

Or, they knew something they were not sharing. Like yet a fourth version of software which would be released shortly. That happened the first week in January, only a month after 2.26 was available. Version 5.0, unlike the 2.25 and 2.26, comes in a significantly modified HSS-100 receiver. For example, Hyundai concurrent with the release of 5.0 has also elected to change the L-band (RF) tuner in the receiver. They have also modified the (UHF) RF modulator by replacing it with a version which is compatible to PAL B (G) format TV transmissions. The "C" version had an RF modulator in it which only worked properly with Chinese terrestrial TV sets. Most satellite users did not care a great deal about the modulator change out as most use the video and audio output jacks on the receiver to feed their monitor or separate (VCR) modulator anyhow. There are other internal mechanical and electrical design changes in the 5.0 (now called HSS-100B/G) version as well. Early reports of the performance of the 5.0 version said the receiver was now "fast" in changing channels (a problem which the 2.05, 2.25 and 2.26 all shared) and somewhat more consumer friendly to operate. Shortly after these positive reports came a more damaging notation:

"The sensitivity of this receiver is significantly less than the previous versions."

Sensitivity is paramount in a consumer IRD. It is the tendency of most DTH installers to use the smallest dish they can get away with, and this results in less signal to work with at the receiver. To further compound the problem, the primary satellite programming sources (AsiaSat 2 and PanAmSat 2) have over the last six months both reduced their operating power levels as their satellites have "filled up." The net result is the satellite signals reaching the ground are weaker, at the same time Hyundai's 5.0 version receiver comes along with a less sensitive tuner. Not good.

The more creative technical types then tried to determine the problem with the 5.0 version and deduced the new L band (RF) tuner was probably responsible for the lower sensitivity.

IRD SAGA Report Two - continued

Removal of the top cover reveals the tuner section is totally new, not merely a modification of an earlier model. Like many first generation models of anything made by man, it has not yet been produced in sufficient quantities to cause refinements.

This immediately led to a test: Could the tuner from an older (2.05, 2.25) version of the HSS-100 receiver be substituted for the new tuner in the 5.0 version? The answer, sadly, was no. The new tuner "talks" to the microprocessor chips in the receiver and obviously it talks a language which is different than the old tuner. In short, changing out the tuner is not the answer. Nor possible.

So Hyundai has a faster, sleeker model that lacks the sensitivity the market demands. At a time when faster is desirable but sensitive is mandatory. The 5.0 version units are quite satisfactory when the user's antenna dish size is adequate; they are not as satisfactory if the signal level from the dish is marginal. It is perhaps unfortunate that Hyundai has chosen to introduce both new software AND a new tuner at the same time. The software is an improvement, the tuner is not.

The story of the Hyundai operating software, meanwhile, came a step closer to being unravelled when enthusiast Stu McLeod with some local help in Napier managed to get a 2.25 version to "dump" 30,000 lines of internal software programming. It was here that McLeod found a date and time stamp that establishes April 19, 1996 as date when the "Hyundai Media Lab (c)" began serious software writing efforts on this receiver. McLeod found that when he software "merged" the memory of the "odd" and "even" chips using a HEX conversion file programme, he had thousands of lines of plain (English language) text which charted the development of the Hyundai software. In effect, as three individual software writers in "Media Lab 1 (C)" worked their way through creating the HSS-100 software, they left a dairy of their progress, and failures. That all of this data should continue to be carried inside of every HSS-100 receiver is quite unusual. An Example:

"Who is the most stupid in Media Lab 1?"

"The answer is Sung Hang DongHihihii!"

Dong (with the proper signature of H.D. Sung) along with G.C. Kim and H.G. Kim were apparently the primary creators of the HSS-100 software. As they struggled to make the software function, including work on a teletext routine which is not actually available to HSS-100 users but which has software written in the chip set, their efforts were documented and "frozen" into the chip set's 30,000 lines of HEX files.

The language of the HEX file follows standard machine routines: 64 characters or spaces for each line with 32 coming from the "odd" chip and 32 from the "even" chip. You can determine whether the Hyundai before you is a 5.0 or earlier version by inspecting the rear apron. There are no version markings apparent (i.e., no place does it say 5.0 except on the software) but the rear deck differs where the L-band tuner mounts (inside the unit). A "lock nut" holds the F connector in place with the *new* tuner, the older version(s) had mounting screws holding the tuner in place.

The new 5.0 version has significantly (1.5 to 2 times) as fast channel surfing - selection (good), although the CPU clock speed has not changed. The UHF modulator now works with Pacific PAL format TV sets (the older C version did not); the UHF output is channel adjustable with a small screwdriver through a slot on the rear apron. And the software creating an on screen system performance display is now extremely fast and very favourable. The older (2.25) version had a *pair* of displays for signal level and signal quality; the new one only deals with signal quality but it does this very well (rated by those who have tested the receiver as "best of any receiver to date").

Alas, if ultimate performance on weak or marginal signals is the objective, the HSS-100B/G (version 5) is getting something less than rave reviews. It is unlikely the sensitivity of the latest version can be improved with a software update as this is the third (or fourth) commercial version software for this receiver and one supposes Hyundai has this segment of the design well in hand. The evidence strongly suggests Hyundai has made an error with their selection of a new tuner for the receiver, and as noted, unfortunately elected to introduce both the new tuner and the new software in a simultaneous release. It is unlikely the new version will be nearly as popular as the earlier 2.25/2.26 levels.

multi-track audio standard of European DVDs released in PAL and SECAM markets (and that includes us). Now individual DVD player makers and DVD (disc) suppliers are free to use any of several differing and not compatible audio systems (Dolby Digital AC-3, MPEG-2 or linear PCM stereo). In NTSC regions of the world, AC-3 remains the agreed to standard and discs are largely provided to that standard. Reason for rescinding is blamed on Philips; allegations that Philips had "promised" to make available MPEG-2 multi-channel audio encoders by a date certain and has failed to do so. Philips claims this report is in error. Other industry spokesmen claim the reality is that movie rights owners have not been pleased with sound tracks done in AC-3 and are using this opportunity to force the hardware and DVD disc suppliers to reconsider their September vote in favour of AC-3. Bottom line: Launch of DVD in Europe which had been slated for April could now be delayed by as much as 6 months.

Five DVD changer has been shown by Sony. DVP-C600 device allows up to 5 movie discs to be preloaded and in carousel mechanism played back on time or sequence commands.

Downward spiralling Asian economies are having significant adverse impact on the consumer electronics industry centred there. Demand from previously fast growing Asian countries is already down more than 40% across the region and there are fears many previously healthy Asian producers of hardware will be badly harmed by the economic problems endemic to the region. China's economic growth is at particular risk - recent years have seen 10% or greater growth per year which fuelled new capital expenditures for additional production capacity. With the downturn now underway in other portions of Asia, China now believes its 1998 growth could be as low as 5% and that is not enough to keep the new production facilities busy nor profitable. However, China has just come off of a record third quarter period producing 2.2 million PCs, up from 1.9 million in same quarter 1996. Indonesia and Thailand reported PC sales fell by 5% each during same quarter, a reflection of economic turmoil in both countries. Korean currency crunch has resulted on Daewoo suspending plans to build CRT plant in France. Lorraine facility was scheduled to open in 1999, produce 10 million CRTs annually by 2000 and employ 700 people.

Low end, two-head VCRs fell below US\$100 at retail level during just ended Christmas selling season. Discounters and major chain stores all offered \$99 price tag. On a more restricted level, 4-head mono VCRs also appeared at same price point under Orion and Funai brand names. US consumer retailists believe the price will drop further, to as low as US\$79 for two-head machines, over next few months. Name brand suppliers have so far resisted the urge to drop pricing to such low levels.

PC marketing in US has reached new low-end pricing point: (US)\$699 for entry level Compaq Presario 2200 with monitor and Hewlett Packard Pavilion 3100 at \$799. Pricing reduction was fuelled by inventory close outs for 166 MHz rated PCs as newer, faster 200 to 233 MHz processor based PCs come on line in quantity. Further price reductions in 233 MHz machines are likely; Intel has announced price drop of 40% for 233 MHz Pentium II chip.

Japan's experience with newly available DV (digital video) camcorders may be signal of what to expect world-wide in 1998. First generation digital units went on sale in Japan in midyear, have captured unreal 55% share of camcorder market by year end. That compares with under 1% of market in USA where DV units arrived several months later and have not been subjected to marketplace hype to date.

Eastman Kodak cut of 10% of world-wide employees has now been doubled to 20% cut; total layoffs now nearly 20,000. The company believes slashing overhead will cut operating costs by more than (US) \$1B in 1999.

"One moment please." New Aiwa stereo portable (HS-PX580), using cassette playback system, has sensor which will stop tape play and sound chime to alert music listener to a telephone call.

Cable/Fibre/MMDS/Pay TV

Sky Network selection of an MPEG format supplier and follow on selection of one or more IRD suppliers for 1998 scheduled digital service has been further postponed. December 16th meeting had been scheduled, was rescheduled to January. Until a transmission format is finally specified, very little else can happen in the migration to digital.

Latest US study shows 75.6% of US homes now have access to "multi-channel" television services. "Multi-channel" means programming choices enhanced beyond those available through local free to air

Sport Programming Costs

Cost for (US) sport event television programming rights have risen sharply during the past 5 to 10 years. Some examples: Baseball rose from US\$189.3 million in 1989 to \$345 million per year currently (shared by ESPN, Fox, fX and NBC); American Gridiron from \$468 million to \$1.1 billion in 1997 (and again up \$400 million for 1998; ABC, Fox, NBC); NBA Basketball from \$27.5 million in 1985 to \$660 million currently (NBC, TBS, TNT). At the same time, off network syndicated programming has gone up 98% on average.

terrestrial (commercial) TV broadcasters. Of that percentage, 66.7 million or 88.2% of total are subscribers to cable TV systems. Next largest group, DTH (satellite served) homes with approximately 7.9% of total. Largest cable operator remains Tele-Communications Inc (TCI) with 14.3 million homes served out of 24 million passed by cable (equating to a cable penetration of 59.4%). In ten largest cable firms in US, top penetration is 70.3% (Adelphia Communications) while lowest is 56.5% (Century Communications). National average is 63.3% penetration

Cable TV technology is hardly immune from onrush of new devices that promise "more throughput" (bandwidth). Latest is Scientific Atlanta system named DWDM (dense wave division multiplexing) which claims ability to pack 128 video (TV) programme channels onto single fibre (optic line); transmission rate is 20Gbps. Impact? Cable systems wired last year or rebuilding this year are already a significant step in "capacity" behind newest development.

Cable digital set-top box pricing. Scientific Atlanta has received order for an undisclosed number of digital set-tops for the Baltimore, Maryland cable system operated by Comcast with a reported price of US\$400 per set-top. 2000 series set-tops provide dual capability to cable subscribers; digital TV delivery through cable system as well as two-way interactive access to Internet and other on-line services. Delivery of first 2000 series boxes will not start until late this year (see following report).

NextLevel, name successor to General Instrument (GI -*), has "won" prize of being selected by 9 major cable MSOs to provide digital set-top boxes for cable TV's major move into direct digital delivery techniques. Set-top units will be upgraded version of present DCT-1000 unit, including improved on screen graphics and cable modem capability. This will allow cable operators to provide high speed Internet access, digital video and audio, pay per view ("impulse viewing"), data and e-mail services, network games and at some future point Internet audio and video services. The price is said to be in the region of US\$300 per set-top box, subject to the precise configuration chosen by each cable operator. Volume of order is the key - up to 15 million set-top units and an order total of US\$4.5 billion. As a part of the agreement, the cable MSOs are gaining warrants allowing them to acquire up to 16% of NextLevel Systems at the street price of \$15 per share. (* - NextLevel Systems will rename itself General Instrument effective February 2.) Next problem: Who will build these 15,000,000 digital boxes? Answer apparently is not GI itself; talks with Thomson and Sony have been underway, Sony appears to be leading contender.

Cable TV consumers are complaining again about double digit price rises for various levels of cable TV service in USA. 1992 Cable Act created method of US regulators to keep clamp on cable rate increases but provided mechanism for approved rate hikes if cable operators were charged more for their programming. Many rate hikes have reflected increases in programme sourcing costs and on the surface that seems to fit the legislative model. However, virtually all important cable programme sources are owned by larger cable MSO (multiple system operator) firms so they in effect sell their programming to themselves. By raising their own costs for programme rights, increased revenue ends up in same corporate pocket and cable firms individually can justify the rate hikes based upon programming cost rises. Regulatory review is anticipated.

Cable TV programmer Discovery and BBC are close to announcing details of new cable and satellite available (in North America only, initially) "Best of BBC" channel. BBC1 and BBC2 programming, including sitcoms, drama, sport and news, will be melded into single programming channel to be distributed by Discovery through its expanding MCPC (digital bouquet) in North America.

Terrestrial Broadcasting

Hello? Is anybody watching??? TV4 Whangarei transmitter lost its video and audio modulation (i.e., continued running but without programming) sometime around 2AM on December 13th. And nobody called to complain about missing programming until after 3PM (13 hours later). We are reminded of the 1950's era UHF TV broadcaster in the state of Connecticut which offered \$50 to the first viewer calling; no catchy question or mystery word. Simply call for the \$50. Nobody did. Thirty minutes later the station upped the prize to \$100. Three breaks later the station was at sign-off and the prize had risen to \$250. Still nobody called. Station management took the station off the air the following day, permanently, and turned in its license.

News Corp's News Ltd. has sold its 14.8% ownership stake in the Australian Seven Network Ltd. for a reported A\$145.2 million. News Corp was instrumental in the original creation of Seven Network; reason given for sale was "increasingly restrictive Australian ownership laws of television services."

America's PBS (non profit Public Broadcasting System) is suggesting that within ten years it could abandon satellite as a method of distributing programming to affiliates in favour of "broadband, hybrid network that would rely primarily upon terrestrial fibre optic linkups." PBS was burned when Telstar 401 satellite quit without warning one year ago, and has been researching how recent developments in terrestrial fibre optic linking might impact on long term plans. What they see, they say, is a single or multiple location "national

archives centre" for all PBS materials, accessible on call by each of its affiliates. Premise is that all PBS materials, past, and present at any point in time, could be called up on demand by affiliate stations and sent via fibre optic digital networks to the affiliate. "This would allow each station to create its own programming schedule against a universe of programming that spans the full history of PBS from day one."

Papal visit to Cuba (January 21 - 25) poses special problems to US networks covering event. US law limits US news organisations from spending more than \$100 per day per head to maintain staff in Cuba. Interest in Pope's visit has sent hotel prices into orbit (up to US\$200 per person per night). Cuban TV is covering papal masses, US networks seeking plug-in rights to coverage are being asked for fees up to \$100,000.

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CONTACTS: Telephone 64-9-406-0651 or fax 64-9-406-1083 promptly as attendance is limited to ensure personal attention to each delegate. Fees may be paid by cheque or credit card; registration forms available by fax.

